

An Investigation of Communicative Competence of ESL Students Using Electronic Discussion Boards

Shenghua Zha, Paul Kelly, MeeAeng Ko Park, and Gail Fitzgerald
University of Missouri-Columbia

Abstract

This study focuses on the use of electronic discussion boards with elementary-aged English as a Second Language (ESL) students. The purpose of the study is to investigate students' communicative competence in a computer-mediated communication environment. Both qualitative and quantitative methods were used to analyze 956 messages posted by 28 ESL students to the electronic discussion board during a six-week period of time. Changes were found in children's use of language for social purposes and appropriate use of language in different social and cultural settings. Recommendations for teachers include the design of online discussion activities and future considerations of peer assistance in language learning. (Keywords: ESL learning, electronic discussion boards, communicative competence, peer interaction.)

English as a Second Language (ESL) education has changed greatly over the past few decades. Earlier popular teaching methods—the grammar-translation method, the direct instruction method, and the audio-lingual method—no longer dominate current approaches. As early as 1976, Wilkins published a syllabus calling for language learning to focus on the development of communicative competence. Ohmaye (1998) echoed that point by stating, “The primary function of language is communication and interaction” (p. 15). Improving students' communicative competence has emerged as the new focus in language instruction. Terrell's natural approach is now widely used in language teaching and learning (Krashen & Terrell, 1983). Terrell defines communicative competence as the use of language in social communications without grammatical analysis. Krashen later expanded this theory of language learning and supported the natural approach, arguing that meaning was more important than the structure of language and that the primary goal of language learning should be the development of communicative skills (Krashen & Terrell, 1983).

Pedagogical changes have also occurred in the role of technology in the language learning area. As the Internet became more readily accessible, computer-mediated interactions between users in different locations increased. As a result, the focus of ESL utilizing computer-assisted language learning (CALL) shifted from drill-and-practice to computer-mediated communication (CMC) (Liu, Moore, Graham, & Lee, 2002). CMC is defined as the application of computer and Internet technology in human communication (Thurlow, Lengel, & Tomic, 2004). Romiszowski and Mason (2004) thought that synchronous and asynchronous communications were two main distinctions in CMC. In synchronous communications, users converse using the technology at the same time (e.g., instant messaging or chats). In asynchronous communications, users transmit information at different times (e.g., messaging on electronic discussion boards and e-mail).

Electronic discussion boards are now being used to provide a natural language learning environment by promoting learners' social interaction and creating an authentic discourse community (Al-Jarf, 2004; Lam, 2000; Singhal, 1998). Recent studies have established that learners have a higher participation rate in CMC than they do in face-to-face communication. This difference is thought to occur because CMC provides an equal opportunity for learners with different cultural background and personalities, thereby increasing participation and use of language (Beauvois, 1992; Gonzalez-Bueno, 1998; Kern, 1995).

BACKGROUND

Peer Social Interaction in CMC Language Learning Environments

According to Vygotsky's (1978) socio-cultural theory, learning is facilitated through interaction with the social environment (interpersonal learning) rather than intrapersonal learning. Language is an important mediation tool in learning as well as in interaction. People learn through and about language in social and cultural interactions. Vygotsky's concept of the "Zone of Proximal Development" (ZPD) describes the gap between what learners can accomplish independently and what learners can accomplish when provided external support. Vygotskians believe that learning occurs when the gap is bridged. The gap can be bridged with support from adults, peers, or artifacts. Piaget's theory of cognitive development is consistent with the Vygotskian perspective of peer support in learning (DeLisi & Golbeck, 1999). Piagetians believe that peer experiences can help individual children modify their cognitive systems and foster intellectual growth, which would not easily be done by children working alone or children working with adults. When learners are involved in peer discussions, their minds are challenged by viewpoints from different perspectives and levels. Therefore, in CMC, peer interaction can be used to help learners acquire new strategies and strengthen their own ideas by engaging in peer dialog through written communication (Beauvois, 1994; Forman & Cazden, 1985; Gellin, 2003; LaPointe & Gunawardena, 2004; Miller, 1995).

A study by St. John and Cash (1995) reports two additional benefits of using peer interactions in online second language learning. First, the learner is able to correct lexical mistakes by noticing differences between his/her usage and the usage of peers with higher language competence, even when the peers don't provide any explicit feedback (St. John & Cash, 1995). Second, the learner's pragmatic competence improves quickly as he/she successfully adopts his/her peer's useful expressions and phrases (St. John & Cash, 1995). Studies also suggest that both learners' knowledge of language and language production increase through online peer interaction (Singhal, 1998; Warschauer, 1996). Students may take a more active role in CMC than they do in face-to-face classroom communication (Chun, 1994). They take initiative in discourse and use language to participate in social interaction by asking peers for their opinions, eliciting information, asking for clarification, and offering feedback to their peers.

In summary, abundant studies have been conducted to investigate advantages of language learning using peer social interactions in CMC. Students in those studies are involved in either collaborative learning tasks (Belz & Kinginger,

2002; Chun, 1994; Lam, 2000; Singhal, 1998; Warschauer, 1996) or class/group discussions with individual assignments (Beauvois, 1992; Beauvois, 1994; Kern, 1995). However, none of these findings compared the effect of collaborative versus individual CMC learning tasks on students' communicative competence.

Appropriate Use of Language in CMC

The Second Language Acquisition (SLA) theorists note that the appropriate use of language is a part of socialization because language is the medium in social interactions (Ochs & Schieffelin, 2001). Therefore, studies of students' appropriate use of language should include the use of language to participate in social interactions. Due to the lack of contextual clues and face-to-face contact in CMC, some uses of language that may not be acceptable or appropriate in face-to-face communications would inevitably appear in CMC interactions. Hence, Bloch (2004) and Daisley (1994)'s ESL in CMC studies raise the issue of what should be defined as the appropriate use of language in virtual environments.

Kern's (1995) CMC study shows that CMC students produce more sentences and use a greater variety of discourse functions (e.g., greetings and assertions) than they do in face-to-face discussions. St. John and Cash's (1995) study finds that students spontaneously adopt their peer's appropriate language use in CMC. However, a case study conducted by Belz and Kinginger (2002) does not find evidence of students' appropriate use of language based on peer interactions. Belz and Kinginger used SLA theories of interlanguage restructuring to interpret their findings. They explained that constant restructuring of the second language (L2) may destabilize some L2 structures that students had previously acquired, and thus resulted in the reappearance of the L2 errors. Because of these sparse and conflicting findings, more studies are needed to define and measure students' appropriate use of language in CMC.

RESEARCH FOCUS

During the last decade, a majority of studies on ESL learning in CMC settings were conducted at the college level (Beauvois, 1994; Belz & Kinginger, 2002; Gonzalez-Bueno, 1998; Kern, 1995; Liu et al., 2002; Warschauer, 1996). Few studies address the second communicative competence in CMC for K-12 students (Chapelle, 1999; Liu et al., 2002). Our study was undertaken with elementary-aged children to examine their ESL communicative competence in an asynchronous discussion board. The study was conducted in seven ESL classrooms in six primary schools in a suburban area in a midwestern metropolitan U.S. city. The purpose of the study was to examine the patterns of K-12 ESL students' communicative competence through peer interaction in collaborative versus individual learning tasks in CMC, with particular attention to appropriate use of language for social purposes. A second purpose of the study was to examine improvements in communicative competence within CMC environments.

METHODOLOGY

The project was conducted in seven elementary ESL classes from mid-March to early May 2003. The intervention included a one-week training period, fol-

lowed by three communication and writing activities in an electronic discussion board. Each activity lasted two weeks consecutively. Prior to participation, students and their parents signed informed consent/assent forms approved by the Campus Institutional Review Board (IRB).

Participants

Twenty-eight ESL students in Grades 2–5 participated in this project. They came from seven classes in six elementary schools. Eighteen of them were male and ten were female. Seven students spoke Spanish and five students spoke Chinese; the others spoke Russian, French, Korean, Arabic, Pohnpeian, Urdu, or Samoan.

The researchers assigned students from the same schools into different discussion groups so that the electronic discussion board was the only site for students in the same group to communicate with each other. Therefore, each group, consisting of three or four students from different schools, had its own discussion section on the discussion board. According to Hoy and Tschannen-Moran (1999), group maturity, such as how well group members know each other and their comfort with each other, would affect learning process and outcomes in small group activities. Hence, in this study, groups changed for each activity so that the maturity of a group could be kept at the same level at the beginning of each of the three activities/tasks.

Task Design

The first week was considered a training week. Students used HP laptops and a wireless Internet connection to access the online discussion board. Students had their own accounts and passwords to log in. They were taught to log into/out of the discussion board, and to read, edit, and post messages. During this training week, they introduced themselves and sent greetings to each other through the board. The purpose was to have students from different schools get to know each other and become more familiar with the use of the discussion board.

The electronic discussion board was hosted on the school system's server. All students, teachers, and researchers had individual accounts to access it during and after the study. The discussion board had a spelling check function. When students finished typing messages and clicked the "Submit" button, a spelling checker would highlight wrong spellings and list correct alternatives. Therefore, students did not have wrong word spellings in the messages as long as they used the spell checker and could recognize the correct spelling of words.

The learning activities were created based on Egbert's (2001, 2002) suggestions for a successful online ESL environment. Egbert's instructional ideas were based on the ESL Standards for PreK–12 Students, which were developed by the TESOL (Teacher of English to Speakers of Other Languages) Standard Committee in 1995 and have been frequently updated. The standards are available on the Web at http://www.tesol.org/s_tesol/seccss.asp?CID=113&DID=1583. As the most widespread communicative competence standards in the United States, the ESL Standards are congruent with the natural approach believing that language learning occurs through meaningful social and cultural interactions (ESL Standards introduction, 1997).

Egbert used ESL Standards as guidelines and suggested that students should have sufficient opportunities to interact socially and actively in CMC environments (2001). She recommended that ESL instruction should provide students with authentic tasks and audience to interact socially and negotiate meanings (2002). Based on these suggestions, three online discussion activities were implemented in this study. These activities followed the one-week training week.

Activity 1— *Creating Clubs*. Students were assigned to small groups. The task was to create club names and suggest two colors and a mascot for their clubhouse flags. After agreeing on their club name, flag colors, and mascot, each group designed and drew a flag for their clubhouse. Activity 1 required group consensus on the name, flag color, and mascot of their clubhouse.

Activity 2— *Recommending a Holiday Menu*. The task was to discuss traditional meals served for holidays in the students' countries or culture and then to decide on a holiday menu to recommend for a lunch at their schools. Each student was required to prepare a letter for his/her school's food manager to recommend a holiday meal and post the letter to the discussion board to share with peers. Students were encouraged to read their peers' food messages and ask/answer questions. This task required sharing and discussion, but did not require group consensus.

Activity 3— *Planning a Party*. Students were required to work together to plan a party. The task included planning food, arranging activities, and planning a budget. After party plans were finalized, each student wrote an invitation to the party. Activity 3 required group consensus on details of their party plans.

The topics of the three activities were chosen because they were closely related to students' real lives and would typically interest K–12 students. All of the three activities had different social settings, and therefore required students' appropriate use of English according to audience, purpose, and settings.

This project was conducted in teachers' offices during the students' ESL class time, one hour for two classes per week. At the beginning of each week during the study, activity instructions were posted to the online discussion boards by the researchers. While working on the activities, the students' ESL teachers could sit beside them at the computers to answer questions, but they were instructed not to interfere with students or correct their writing. They could explain instructions to the students to make sure that students knew what they should do in the online activities, but teachers were not to direct students' work.

DATA COLLECTION AND ANALYSIS

Students' messages to the discussion board were captured in rich text format (RTF format) for importing into NVivo 2.0, a qualitative analysis software program (QSR International). Messages for each week were imported as one document and arranged according to chronological order of message posting.

Qualitative Analysis

The researchers coded the messages using the national ESL Standards for PreK–12 Students to examine ESL students' communicative competence. Using the ESL Standards, nineteen competence indicators from four areas were used

as coding nodes. These indicators were selected because they matched the types of communication for appropriate use of written English in social settings expected in the online discussion activities. As seen in Table 1, the messages were coded for use of English to participate in social interaction (Goal 1 Standard 1), use of written English for personal expression and enjoyment (Goal 1 Standard 2), use of learning strategies to extend communicative competence (Goal 1 Standard 3), and use of appropriate English variety, register, and genre according to audience, purpose, and settings (Goal 3 Standard 1).

As suggested by Creswell (2003) and Miller & Worthington (2001), the coding practice/training would help researchers enhance the consistent interpretation of data and reduce individual interpretive bias. Before coding discussion board messages, three researchers chose messages from students' discussions to practice coding independently until 90% or greater reliability of coding was achieved. Differences in coding were constantly compared, discussed, and resolved to meet this level of consistency. At that point, a coding book was developed for use during the remaining data analysis. Additional coding rules were defined to establish consistency in segmenting the messages for coding. A coding unit was defined as a sentence. When coding greetings and farewells that were not complete sentences, a greeting or farewell chunk was defined as a coding unit. Following are some examples of coding.

Indicator 1.1A: Asking peers for their opinions, preferences, and desires.

ex.: "What color do you want to put on the flag?"

Indicator 1.1C: Offering and responding to compliments and invitations.

ex.: "I just wanted to let you know that I think the party you thought about is a good idea because I like to go to the movies."

(Note: This was double coded as 1.2E: Stating and supporting a personal reference.)

Indicator 3.1F: Greet and take leave appropriately.

ex.: "I hope write me back."

Messages posted during the three activities were combined into one NVivo file for analysis after being coded separately by three researchers. Altogether, the 28 students posted 956 sentences or chunks of messages to be coded. Those messages were coded or double-coded under node categories to study students' use of English to participate in social interaction, use of English for personal expression and enjoyment, use of learning strategies to extend communication competence, and use of appropriate English variety, register, and genre according to audience, purpose, and settings. An example of a message coding using NVivo is displayed in Figure 1 (page 358).

Table 1: Codes Adopted from ESL Standards

Goal 1. To use English to communicate in social settings

Standard 1. Students will use English to participate in social interaction.

Node Node Indicators

1.1A Asking peers for their opinions, preferences, and desires.

1.1B Eliciting information and asking clarification questions.

1.1C Offering and responding to compliments and invitations.

1.1D Negotiating solutions to problems, interpersonal misunderstandings, and disputes, or seeking agreement.

Goal 1. To use English to communicate in social settings

Standard 2. Students will interact in, through, and with spoken and written English for personal expression and enjoyment.

Node Node Indicators

1.2A Describing an activity.

1.2B Recommending a game, book, or an activity.

1.2C Talking about a favorite food.

1.2D Expressing humor through verbal and nonverbal means.

1.2E Stating and supporting a personal preference.

1.2F Describing or stating a personal preference without support.

Goal 1. To use English to communicate in social settings

Standard 3. Students will use learning strategies to extend their communicative competence.

Node Node Indicators

1.3A Use of self-monitoring and self-evaluating language, or correcting language of others.

1.3B Ask someone the meaning of a word.

Goal 3. To use English in socially and culturally appropriate ways

Standard 1. Students will choose a language variety, register, and genre according to audience, purpose, and setting.

Node Node Indicators

3.1A Responding to and using slang appropriately.

3.1B Responding to and using idioms appropriately.

3.1C Determining when it is appropriate to use a language other than English.

3.1D Make polite requests.

3.1E Demonstrate an understanding of ways to show gratitude, or polite response.

3.1F Greet and take leave appropriately.

3.1G Make an apology.

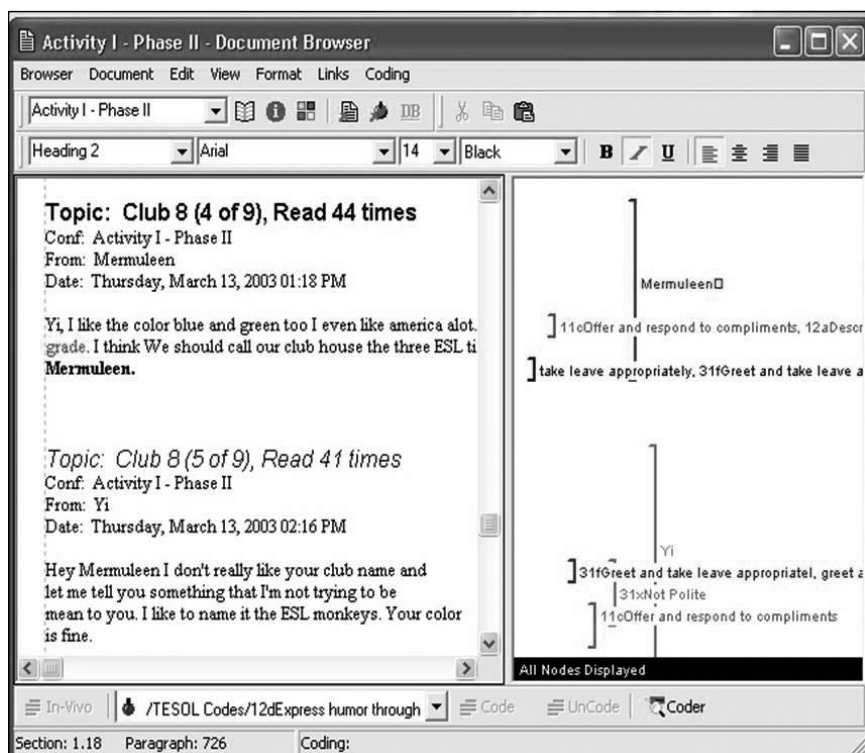


Figure 1. Example of message coding using NVivo.

Research memos were also created during the coding process to help researchers summarize and extract themes from coded messages. An example of a research memo integrated into NVivo to assist with interpretation is shown in Figure 2.

After the coding, the children's messages for Activities 1–3 were further analyzed using both qualitative and quantitative procedures. The first-week introductory discussion board activity was excluded from the analysis because unlike peer interactions in the following activities, children's self-introduction was conducted under the guidance of instructors and researchers in this training session. Quantitative analysis was undertaken to examine the changes of children's communicative competence measured by the ESL Standards in the three CMC activities. Variables in the quantitative analysis were frequencies of children's use of language coded under specific indicators in the ESL Standards.

Further qualitative analyses were undertaken to examine students' qualitative improvement in their use of English through the three consecutive activities. Messages were analyzed in each of the three standards.

Goal 1 Standard 1: Use of English to Participate in Social Interaction.

No discernable improvements were found in the quality of students' written messages when asking for peers' opinions, preferences or desires, eliciting infor-

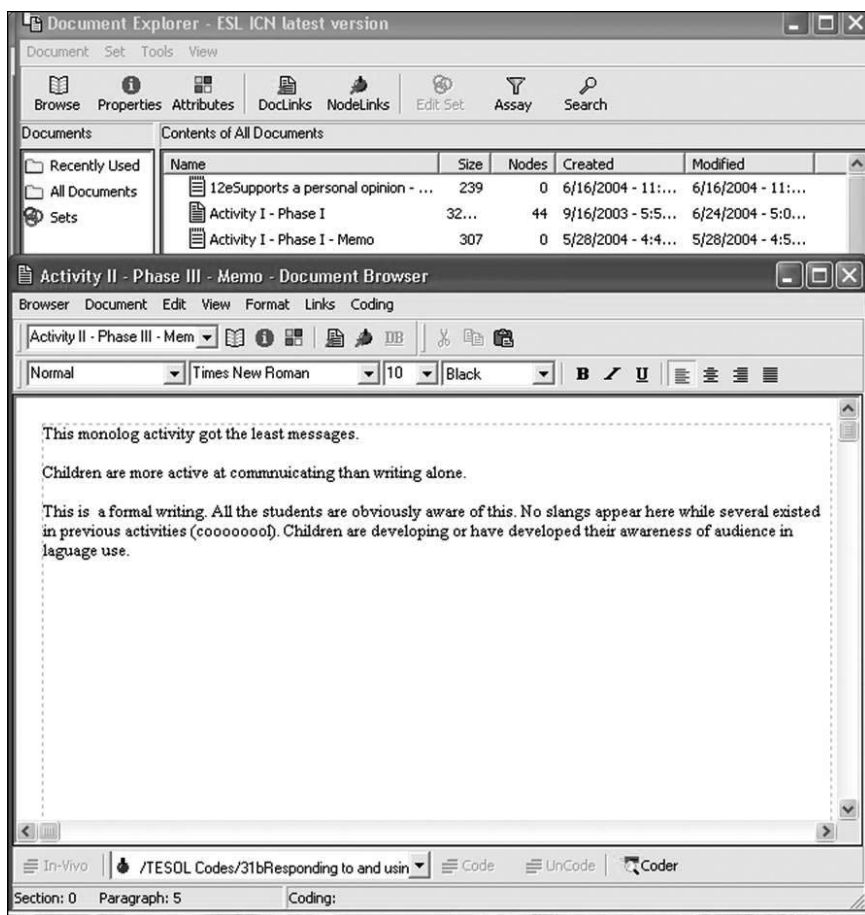


Figure 2. Example of a research memo in NVivo.

mation and asking clarification questions, offering and responding to complements, invitations and introductions, and negotiating solutions to problems, interpersonal misunderstanding, and disputes.

Goal 1 Standard 2: Use of English for Personal Expression and Enjoyment.

Students' informal use of language appeared in discussions for Activity 3 (planning a party). For instance, one of the students expressed humor in his message as "I like your party, but can your afford all that:????????!!!!!!!" (coded 1.2D)

Goal 1 Standard 3: Use of Learning Strategies to Extend Communicative Competence.

Only five messages were coded in this standard. No evident improvements were found in the quality of students' language when they self-monitor and self-evaluate their language, and ask for the meaning of a word.

Goal 3 Standard 1: Use of Appropriate English Variety, Register, and Genre According to Audience, Purpose, and Settings.

Informal uses of language were found not only in discussions for Activity 3 but also in discussions for Activity 1 (creating clubs). An example from Activity 1 was students' appropriate use of slang.

"Cooooooooooooooooo! Are you goood?" (coded 3.1A).

But in Activity 2, when students wrote letters to the food manager, the sentences were more formal.

"(Dear Mr. Levin,) I'm writing this letter to you about what we want for lunch....."

"(Dear Mr. Levin,) I would like to recommend Sarah's food, (name of the food). The reason I want us to have it is because....."

However, not all the students used appropriate English at the beginning of Activity 2. In the first week of Activity 2, four students used vague salutations or no salutations in the letter to food managers, as seen in this example "Hi my food for **** holidays is" In the second week of Activity 2, improved communicative competence was evident. All students addressed letters clearly and appropriately to food managers, as seen in this example.

April 24, 2003

Dear Mrs. (Name),

I would like to recommend (Name)'s food.....

Sincerely,

(Name)

The use of idioms (3.1B) only occurred in Activity 3 (planning a party). Fourteen out of its 16 instances of idioms were the use of "RSVP" in party invitations. Three instances appeared in the first week of Activity 3, while 11 instances occurred in the second week.

Closely related to the use of "RSVP" was students' use of a unique format in composing invitations. This format first appeared in the first week of Activity 3 as illustrated in the following example.

Come to a Hawaiian Party!

When: Friday, May 30, 3:30 P.M.

Where: At the clubhouse pool.

What: Bring your swimsuit.

We will play games and swim! We will eat at 4:35.

RSVP: Lulu (name) 555-5555 (phone number)

Three other students posted messages after this one. All of them followed this concise format. When Activity 3 moved to its second week, this format was initiated by one student and was copied in the following 10 out of 12 messages.

Students' use of English became less formal in their use of greetings and farewells as they became more experienced with online communication. Twenty-five formal instances out of 91 (27.5%) messages occurred in Activity 1. Students used clear and polite salutations and farewells to address each other in these instances, as "Dear (their peer's Name)" and "Yours Sincerely, (Name)." In comparison, during Activity 3, only 21 instances out of 114 messages (18.4%) used formal greetings and farewells to address each other, even though the children were assigned to different groups and had to establish new connections.

Quantitative Analysis

Based on the analysis of coded messages, paired sample t-tests were conducted to test for significant changes in communicative competence across the three activities. Students' communicative competence was examined for three standards—Goal 1 Standard 1, Goal 1 Standard 2, and Goal 3 Standard 1. Goal 1 Standard 3 was not included in quantitative analysis as there were insufficient instances coded for students' use of learning strategies.

Instances of nodes for each activity for these standards were summed and used in the paired sample t-test analysis. Three SPSS data files were created, and data in each standard was organized as one file. In each file, node instances in the three activities were used as variables and each student as one case.

Goal 1 Standard 1: Use of English to Participate in Social Interaction.

As displayed in Table 2, there were significant differences in students' use of English in social interaction between Activity 1 and Activity 2 ($p_{\text{activity1}\&\text{activity2}} < .01$), and between Activity 2 and Activity 3 ($p_{\text{activity2}\&\text{activity3}} < .01$). The students' uses of English to participate in social interaction decreased in Activity 2 and then increased in Activity 3 ($M_{\text{activity1}} = 2.43$, $M_{\text{activity2}} = 0.89$, $M_{\text{activity3}} = 2.21$). Although students' use of English in social interactions decreased between Activity 1 and 3, it was not a significant difference ($p_{\text{activity1}\&\text{activity3}} > .05$).

Table 2: Students' Use of English in Social Interaction

Paired Activities	N	Mean	Standard Deviation	t	Sig. (2-tailed)
Activity 1 Activity 2	28 28	2.43 .89	2.873 1.066	2.803	.009
Activity 2 Activity 3	28 28	.89 2.21	1.066 2.315	-2.966	.006
Activity 1 Activity 3	28 28	2.43 2.21	2.873 2.315	.429	.671

Goal 1 Standard 2: Use of English for Personal Expression and Enjoyment.

As depicted in Table 3, students' use of written English for personal expression and enjoyment showed significant differences between Activity 1 and 2 ($p_{\text{activity1}\&\text{activity2}} < .01$) and between Activity 1 and 3 ($p_{\text{activity1}\&\text{activity3}} < .05$). It increased for each activity ($M_{\text{activity1}} = 1.07$, $M_{\text{activity2}} = 2.21$, $M_{\text{activity3}} = 2.54$). But no significant changes were detected between Activity 2 and 3 ($p_{\text{activity2}\&\text{activity3}} > .05$).

Table 3: Students' Use of Written English for Personal Expression And Enjoyment

Paired Activities	N	Mean	Standard Deviation	t	Sig. (2-tailed)
Activity 1 Activity 2	28 28	1.07 2.21	.858 1.664	-3.323	.003
Activity 2 Activity 3	28 28	2.21 2.54	1.664 2.950	-.648	.523
Activity 1 Activity 3	28 28	1.07 2.54	.858 2.950	-2.721	.011

Goal 3 Standard 1: Use of Appropriate English Variety, Register, and Genre According to Audience, Purpose, and Settings.

As displayed in Table 4, students' appropriate use of written English in accordance with audience, purpose, and settings decreased from Activity 1 to Activity 2, and then increased from Activity 2 to Activity 3 ($M_{\text{activity1}} = 3.96$, $M_{\text{activity2}} = 3.36$, $M_{\text{activity3}} = 4.00$). However, neither the decline nor the increase was statistically significant ($p_{\text{activity1}\&\text{activity2}} > .05$, $p_{\text{activity2}\&\text{activity3}} > .05$, $p_{\text{activity1}\&\text{activity3}} > .05$).

Table 4: Students' Use of Appropriate English Variety, Register, and Genre According to Audience, Purpose, and Settings

Paired Activities	N	Mean	Standard Deviation	t	Sig. (2-tailed)
Activity 1 Activity 2	28 28	3.96 3.36	4.316 1.747	.918	.367
Activity 2 Activity 3	28 28	3.36 4.00	1.747 3.569	-1.150	.260
Activity 1 Activity 3	28 28	3.96 4.00	4.316 3.569	-.046	.964

RESULTS

Goal 1 Standard 1: Use of English to Participate in Social Interaction

The amount of students' appropriate use of English for social interaction decreased significantly in Activity 2 and increased significantly in Activity 3. Activities 1 and 3 were organized as small group tasks that required students to reach a consensus. In Activity 2, students mainly worked on their own food recommendation letters. They did not need to pick the best for the group and come to agreement on a recommendation. The non-collaborative nature of Activity 2 may have resulted in the decrease in students' participation in social interaction. This result conforms to previous studies that online activities requiring peer interactions would help improve students' language production (Singhal, 1998; St. John & Cash, 1995; Warschauer, 1996). Although interaction is essential to language learning, this result also suggests that small group collaborative activities that require students' communication and consensus-building is a better strategy for increasing their use of English to participate in social interaction.

Goal 1 Standard 2: Use of English for Personal Expression and Enjoyment

The results of quantitative analysis demonstrated that students' use of English for personal expression and enjoyment increased despite the fluctuating number of messages across the three activity periods. The increase was not related to the organization of the tasks (individual vs. collaborative) either. One explanation for this finding is that as electronic discussion boards offer an equal opportunity for peer interaction, students may feel more comfortable in expressing their own opinions and preferences after adapting themselves to the learning environment. However, few language studies have focused on students' use of language for personal expression and enjoyment, even though it is one of the ESL Standards to measure learners' communicative competence (Gonzalez-Bueno, 1998). The findings of this study suggest that electronic discussion boards can be used to encourage students' use of language for personal expression and enjoyment.

Goal 3 Standard 1: Use of Appropriate English Variety, Register, and Genre According to Audience, Purpose, and Settings

Students' appropriate use of suitable English variety, register, and genre according to audience, purpose, and settings declined from Activity 1 to Activity 2 and increased in Activity 3. However, neither change reached a level of significance. On the other hand, qualitative analysis revealed that students corrected their language use according to audience, purpose, and settings under the influence of their peers' messages. It was evident that students adopted their peers' appropriate writing styles and made corrections in their own writing styles accordingly. It confirmed results from St. John and Cash's study (1995) that peer interaction in CMC can help learners improve their appropriate use of language.

It cannot be concluded that all written peer influences are positive for learning. Further study is needed to explore peers' influence in online text-based communication. However, the positive written peer influences found in this study and previous studies (Beauvois, 1994; Forman & Cazden, 1985; Miller,

1995; Singhal, 1998; St. John & Cash, 1995; Warschauer, 1996) show that a powerful strategy for improving written expression and language use might be the integration of peer review into online discussion board activities.

The results from the qualitative analysis suggested that students had a tendency toward casual rather than formal social interaction throughout the three activities. As students accommodated to the learning environment of the electronic discussion board, their written communication with their peers developed into a combination of formal and informal expressive patterns that included use of slang. This change was inconsistent with Warschauer's (1996) suggestion that CMC could be used to develop students' formal use of language, which was derived from his comparison study of students' use of language in face-to-face versus online communications. The inconsistency might be explained by students' familiarity with their peers and communication media. When students are not familiar with a CMC environment and their peers, they use formal language to keep their distance from their peers and the communication environment. When they accustom themselves to a CMC environment and know their peers well, they would use informal language as they do in casual face-to-face communications.

These findings support Vygotsky's (1978) theory by showing that online interpersonal interactions help ESL students learn to use appropriate language in different social settings. Although students' correction of language under peer influence was also observed in Activity 2, more instances were identified in collaborative activities (Activity 1 and 3), which demonstrated that collaborative activities/tasks promoted students' interactions to a greater extent, and therefore provided them more opportunities to observe their peers' written language and to increase their awareness of appropriate use of language.

In summary, this electronic discussion board offered an excellent opportunity to observe and facilitate K–12 ESL students' use of different language styles, including formal and informal patterns. Although some improvement was found in students' posted messages in the electronic discussion board, it is recommended that pre- and posttesting could be combined with this study to document students' individual growth in communicative competence. Items of the tests could be related to the goals in the ESL Standards for PreK–12 students. Formalized testing would provide a way to assess language improvement observed in the qualitative results.

LIMITATIONS

Students in this study had diverse ethnic and cultural backgrounds. Some of them have lived in the United States for quite a long time and probably have adjusted to American culture. Because of this influence, the researchers could not examine the effect of ethnic differences on students' second language acquisition in this study.

There were time constraints for students' participation in the discussion board activities. Due to scheduling, the ESL students had only one hour twice a week to participate. The total amount of time they were actually involved is unknown. Time, as well as other factors such as absenteeism, may have contributed to the fluctuation in students' participation that was observed.

CONCLUSIONS AND RECOMMENDATIONS

This article examined K–12 ESL students' communicative competence in an asynchronous discussion board using three CMC activities. Three activities were conducted during a six-week duration. Twenty-eight students posted 956 sentences or chunks of messages. Qualitative and quantitative methodologies were used to analyze students' use of language for social purposes, and improvements in communicative competence observed within the CMC activities.

In this study, students had a higher participation rate in collaborative activities and tasks than they had in individual activities and tasks (Goal 1 Standard 1). Students' use of written language for personal expression and enjoyment increased throughout the CMC activities (Goal 1 Standard 2). Although no significant change was found in socially and culturally appropriate uses of language, there were instances in which students corrected their use of language when influenced by their peers' messages (Goal 3 Standard 1).

As students gain experience with online communication, it appears that they adapt their style according to genre. Analysis of messages revealed that students used informal language to a greater extent as they became more familiar with the learning environment. These include use of slang and idioms, making polite requests, demonstrating gratitude, and greeting and leaving appropriately (Goal 3 Standard 1). When viewing students' messages within activities, changes can be observed where students learn from each other's messages and adopt slang and idioms. However, based on the quantitative findings in this study, it may take longer and require more online experience before students demonstrate measurable improvements in appropriate use of genre (Table 4) or use peer-assisted learning strategies. There was little evidence that students used learning strategies to extend their communicative competence (Goal 1 Standard 3). Students rarely used self-monitoring or self-evaluating strategies, corrected each other's language, or requested meanings of words from others. Such peer-assisted learning strategies are ways of providing support to language learners that help scaffold their zone of proximal development. It is possible that involving students in longer-period activities that require consensus building with a common group product will promote peer assistance for language learning in online environments; however, this remains a hypothetical recommendation. Future studies should examine K–12 ESL students' use of peer-assisted language learning strategies in CMC environments. How to promote students' self-monitoring or self-evaluating strategies in ESL CMC environments? Do those peer-assisted learning strategies increase students' awareness of appropriate use of language? Answers to these questions would help ESL teachers design effective activities and learning environments in the future.

The results of our study offer several guidelines to ESL teachers for effective use of electronic discussion boards to facilitate and improve K–12 ESL students' written communicative competence. First, electronic discussion boards can be utilized as a learning environment to encourage students to observe their peers' written language. Activities involving peer review or peer observation would help students correct their use of language. Second, it is apparent that online group activities can be used to promote students' use of language (Table 3)

but different types of requirements will affect participation. Tasks that require students to meaningfully interact and reach group consensus would help to increase participation (Table 2). By participating in consensus-building activities that require students to reach a group decision, students would be more likely to use the skills identified in the standards as asking for preferences, asking clarification questions, responding to others, negotiating solutions, and seeking agreement (Goal 1 Standard 1). Third, as results of implementations indicated in this study, teachers can help students distinguish different patterns of language variety, register, and genre by having them involved in authentic language tasks. Those tasks must require the use of skills as responding to/using idioms/slang, determining when it is appropriate to use a language other than English, making polite requests, demonstrating an understanding of ways to show gratitude, or polite response, greeting and taking leave appropriately, and making apology (Goal 3 Standard 1).

The outcomes of this study support Egbert's assertions that ESL children are able to learn to use these environments, engage in appropriate social interaction, successfully engage in authentic work tasks, and interact socially and negotiate meaning with others (2002). Using CMC as language learning environments can help teachers implement ESL Standards in ESL teaching (Egbert, 2001).

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Contributors

Shenghua Zha is a doctoral student in the School of Information Science and Learning Technologies at the University of Missouri-Columbia. Her research interests include computer-mediated communication, ESL learning, and computer-supported collaborative learning. (Address: Shenghua Zha, 118 London Hall, University of Missouri-Columbia, Columbia, MO 65211; sz5wf@mizzou.edu.)

Paul Kelly is a doctoral student in the School of Information Science and Learning Technologies at the University of Missouri-Columbia, and Assistant Superintendent of Schools in Park Hill School, MO. His research interests include K-12 technology integration, the digital divide, and electronic communities. (Address: Paul Kelly, Park Hill School District, 7703 NW Barry Road, Kansas City, Missouri 64153; pvk0fa@missouri.edu.)

MeeAeng Ko Park is a doctoral student in the School of Information Science and Learning Technologies at the University of Missouri-Columbia. Her research interests include multicultural issues in information science and learning technologies, the digital divide, and online communication. (Address: MeeAeng Ko Park, 111 London Hall, University of Missouri-Columbia, Columbia, MO 65211; mak0ea@mizzou.edu.)

Dr. Gail Fitzgerald is a professor in the School of Information Science and Learning Technologies at the University of Missouri-Columbia. Her research interests include multimedia, case-based teaching, electronic performance sup-

port tools and computer-mediated communication in teacher education. (Address: Gail Fitzgerald, 303 Townsend Hall, University of Missouri-Columbia, Columbia, MO 65211; FitzgeraldG@missouri.edu.)

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